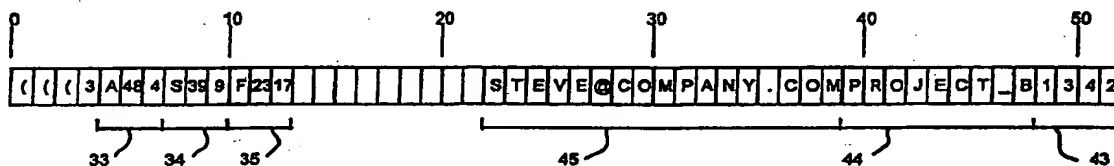




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H04L 12/58, H04Q 7/22, 7/32		A2	(11) International Publication Number: WO 99/52247
			(43) International Publication Date: 14 October 1999 (14.10.99)
(21) International Application Number: PCT/SE99/00428		(81) Designated States: AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 18 March 1999 (18.03.99)			
(30) Priority Data: 9800992-1 24 March 1998 (24.03.98) SE			
(71) Applicant (for all designated States except US): SENDIT AB [SE/SE]; Positionen 129, S-115 74 Stockholm (SE).			
(72) Inventor; and			
(75) Inventor/Applicant (for US only): WERKANDER, Peter [SE/SE]; Stinsgränd 6, 2 tr., S-191 70 Sollentuna (SE).			
(74) Agent: AWAPATENT AB; P.O. Box 45086, S-104 30 Stockholm (SE).		Published In English translation (filed in Swedish). Without international search report and to be republished upon receipt of that report.	

(54) Title: METHOD AND ARRANGEMENT FOR TRANSFERRING INFORMATION USING AN EXISTING MESSAGE BASED SERVICE IN A DIGITAL NETWORK



(57) Abstract

The present invention relates to methods and arrangements for transmitting information in a message using an existing message based service in a digital mobile network. According to the invention, said message is provided with an information field intended to be extracted from said message by said receiver. Furthermore, said message is provided with a pointer field in a position which is given by a predetermined rule while using a predetermined syntax and comprising information which indicates where in said message said information field is arranged.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

METHOD AND ARRANGEMENT FOR TRANSFERRING INFORMATION
USING AN EXISTING MESSAGE BASED SERVICE IN A DIGITAL
NETWORK

Field of the Invention

The present invention relates to a method and an arrangement for transferring to a receiver information in a message using an existing message based service in a digital mobile network.

The present invention also relates to a method and an arrangement for receiving in a receiver information in a message which has been transferred to the receiver with the aid of an existing message based service in a digital mobile communication network.

Background of the Invention

There are currently a number of examples of message based services which are provided according to given standards in digital mobile networks. As examples, mention can be made of the message based services SMS and USSD in the digital mobile network GSM, but the invention is also applicable to similar message based services in other existing or future digital mobile networks such as GPRS, CDMA, D-AMPS (IS-136), PDC (Pacific Digital Cellular), W-CDMA (Wideband Code Division Multiple Access) and UMTS/IMT-2000.

These message based services are used today in many different ways, normally to transfer text information which is to be presented on a display of a receiving mobile station, but also to transfer text or data which should be interpretable by the receiving mobile station in different ways, for instance, as described in the international patent specification WO 96/01077 in the name of the applicant of the present invention. Lately, said message based services have therefore been used as a

basis for the provision of many new types of supplementary services.

When information in the form of text or data is to be incorporated in such a message in such manner that the receiver can collect the information from the message to treat it in the desired manner, it is necessary that the sender and the receiver have agreed on a syntax of the configuration of the message, i.e. the sender and the receiver must agree how the information should be structured in the message. This is a problem since different operators or people involved prefer different types of syntax, for instance, depending on language differences but also depending on different wishes about the type of information or service to be comprised in or provided by the message. If the message based service should also be used for transferring information in connection with different types of services, each service must in many cases have its own syntax and therefore both the sender and the receiver have to master several syntaxes.

Object of the Invention

The object of the invention is to overcome the above problems by providing a functionality which in a simple way takes different operators' demands or wishes for different syntaxes into account and also can handle such demands.

Summary of the Invention

According to a first aspect of the invention, the above-mentioned object is achieved by a method and an arrangement of the type mentioned by way of introduction for transmitting to a receiver information in a message using an existing message based service in a digital mobile network, the invention being characterised in that said message is provided with, on the one hand, an information field which is intended to be extracted from said message by said receiver and, on the other, a pointer

field in a position which is given by a predetermined rule while using a predetermined syntax, said pointer field comprising information which indicates where in said message said information field is arranged.

5 According to a second aspect of the invention, the above-mentioned object is achieved by a method and an arrangement of the type mentioned by way of introduction for receiving in a receiver information in a message which has been transferred to the receiver by means of an
10 existing message based service in a digital mobile network, the invention being characterised in that a pointer field, which is arranged in the message and comprises information indicating where in said message a relevant information field is arranged, is read in said message from
15 a position which is given by a predetermined rule while using a predetermined syntax, and that said information field is extracted in said message from the position which is indicated by said pointer field.

 Thus the invention is based on the idea of also providing the message with a pointer field, in addition to
20 the information fields (text and data) which should be extractable and treatable intelligently in the receiver, said pointer field indicating where the information fields intended for extraction can be fetched in the message. In this way, different operators only have to agree
25 on the rule which indicates where the actual pointer field should be located in the message, how it should be structured and how the information in the pointer field should be interpreted. On the basis of such a rule, individual user groups can choose to locate and structure
30 their information fields in the way they wish. One and the same rule (one and the same format) can thus be used to define different types of services.

 According to a preferred embodiment of the invention,
35 said pointer field comprises information which indicates to what type of information said information field relates. In this way, the pointer field can indi-

cate whether the information in the information field consists of a telephone number, an e-mail address, an IP address, an identification number, a password, the identity of the sender, the size of a stored e-mail or fax message associated with the received message, the computed time for transferring such an e-mail or fax message, or the like. This is suitably achieved by one or more characters in the pointer field containing a binary coded hexadecimal number, which according to the predetermined rule is associated with a certain type of information according to that stated above. Hence, this gives the possibility of defining various types of notifications/messages/services on the basis of one and the same rule.

According to one embodiment, said pointer field is used to indicate information fields which comprise text or data which is to be presented visually or stored in the receiver. However, a particularly preferred alternative is that of using said pointer field to indicate information fields which comprise an identifier intended to be used by said receiver when fetching or re-routing a file stored at a place which is remote from said receiver, for instance, an agent of the type disclosed in the above-mentioned international patent specification WO 96/01077, which is incorporated herein by reference.

A preferred way of identifying in the pointer field the position of the associated information field is that the pointer field in accordance with the determined rule comprises information which indicates in said message the position which corresponds to the beginning of said information field. In addition, it is preferred that the pointer field should also comprise information which indicates the length of, or the position in said message which corresponds to the end of, said information field. However, it will be appreciated that other ways of indicating the position of the associated information field are also applicable.

It should be understood that the most interesting application of the invention is the case where said receiver is a mobile station, such as a mobile telephone, or a so-called smart phone. It can be established that mobile telephones are increasingly integrated with a preferably portable computer to form a single unit, and it should be understood that the invention is, of course, applicable to such units. It should, however, be understood that the invention is not limited to the case where the receiver is a mobile station. The communication can just as well take place between, for instance, two fixed points as long as said message based service in the mobile network is used according to the invention.

It is preferred that said digital mobile network is the GSM network and that said message based service is either SMS or USSD. Consequently, the following description of an exemplifying embodiment will refer to the message based service SMS in the GSM network. As previously mentioned, it should, however, be understood that the invention is not limited to these systems, but can also be applied to other existing or future digital mobile networks having message based services of a similar kind, such as the digital mobile networks GPRS, CDMA, D-AMPS (IS-136), PDC (Pacific Digital Cellular), W-CDMA (Wideband Code Division Multiple Access) and UMTS/IMT-2000.

Additional advantages, aspects and features of the invention will appear from the following description of an exemplifying embodiment.

Brief Description of the Drawings

An exemplifying embodiment of the invention will now be described with reference to the accompanying drawings, in which:

Fig. 1 shows schematically a system for providing a short message based service according to the invention;

Fig. 2 shows schematically the general structure of a message in accordance with the existing message based service SMS in the digital mobile network GSM;

Figs 3a-3c show examples of embodiments of an SMS message according to prior-art technique; and

Figs 4a-4c show examples of embodiments of an SMS message according to a preferred embodiment of the present invention.

10 Detailed Description of an Exemplifying Embodiment

A system for providing a short message based service, which is structured according to the invention, will now be described with reference to Fig. 1.

The system 10 in Fig. 1 comprises an MSC 20 (Mobile Service Switching Centre) which is included in the digital mobile network GSM (Global System for Mobile Communication) and which communicates via a base station 26 with a mobile station 22. The mobile station 22 can, for instance, be a mobile telephone, a portable computer connected to the network, or a "smart phone", which can essentially be considered as a combination of the mobile telephone and the portable computer. The MSC 20 administers the traffic to/from the mobile station 22, which can include, for instance, person-to-person calls as well as voice mailbox messages, short message based services, such as SMS, and the like.

SMS messages, which are to be routed through the mobile network, are connected via a so-called SMS centre (SMS-C) 18, which directs SMS messages to the right receiver. In this example, the system 10 also includes a server 12 which provides different kinds of services via the mobile network and which communicates with the mobile network via an interface 16. For this purpose, the server 12 uses a database 14 for storing, preferably temporarily, different types of messages, such as e-mails, fax, SMS messages and the like, or other contents such as a WWW page or the like, which are to be sent to the re-

ceiver in question on a suitable occasion. The messages stored in the database 14 can, for instance, be created in the actual server 12, but they could just as well originate from, for instance, mobile stations connected to the mobile network or from users who communicate via some other type of network to which the server 12 has direct or indirect access, such as the Internet.

Furthermore, the mobile station 22 comprises a client function 24 which provides the mobile station with means for decoding and structuring the SMS messages, for instance, in accordance with the description below.

An exemplifying mode of operation of the system in Fig. 1 will now be described. According to this mode of operation, the server 12 is arranged at a teleoperator's to receive e-mails addressed to the subscriber having the mobile station 22. At the reception of such an e-mail message, the server 12 stores it in the database 14. At the same time, the server 12 creates a notification SMS message which includes an identifier for the received e-mail message, also referred to as "agent", which indicates in a unique manner a route to the location of the associated e-mail message on the server. The identifier can, for instance, include a telephone number to the server 12, a password and a unique address of the specific e-mail message. This SMS message is subsequently sent to the mobile station 22 via the interface 16, SMS centre 18, MSC 20 and base station 26. At the reception thereof, the client function 24 in the mobile station 22 decodes the identifier received in the SMS message, the owner of the mobile station 22 being able to initiate down-loading, forwarding or the like of the stored e-mail message by means of the identifier.

The general structure of a message, here referred to as SMS message, according to the existing message based service SMS in the digital mobile network GSM will now be described with reference to Fig. 2. As is evident from Fig. 2, an SMS message 20 comprises essentially three

parts: a head portion 21 whose configuration is to a great extent the result of a standard defined for the SMS service; a user text portion 22 which usually includes the actual message to the receiver (this is the text portion which is normally shown on the display of the mobile station, as will be described below); and a check sum 23 which is used to verify that the SMS message has been received correctly in its entirety. The actual user text portion 22 typically consists of either 160 characters containing 7 bits or 140 characters containing 8 bits. Each character containing 7 bits is usually represented in binary coded hexadecimal form in ASCII code or the like.

When designing services which make use of SMS messages of the kind shown in Fig. 2, it is primarily the structure of the user text portion 22 which is modified depending on the current application, since the configuration of the head portion 21 and the check sum 23 is mainly the result of a standard defined for the mobile network. Thus the examples of structures of an SMS message which are shown in Figs 3a-3c and Figs 4a-4c below relate to the structure of the actual user text portion 22, which does not, however, lead to any restrictions on the invention in this respect.

Examples of structures of the user text portion of an SMS message according to prior-art technique will now be described with reference to Figs 3a-3c. It is to be noted that each square in the SMS messages in Figs 3a-3c and Figs 4a-4c corresponds to a character of 7 bits which when transferred is usually represented in a binary coded hexadecimal form in ASCII code or the like. In addition, it is assumed in these figures that the character "/" is intended to signify end of line.

In Fig. 3a, the SMS message is structured as a conventional text message intended to be read by the receiver. As a result, the message will be presented on the display of the mobile station as follows:

HELLO JOHN
CALL 8246
STEVE

5

In Fig. 3b, the user text portion of the SMS message begins with the characters "##", which in this case is assumed to be an instruction which indicates to the receiving mobile station that the subsequent text field is structured in accordance with a predetermined syntax. In the case shown, it is assumed that this predefined syntax indicates that the characters which are located between the initial characters "##" and the next character for end of line "/" relate to a sender, and that the subsequent characters up to the next character for end of line
15 "/" relate to the subject of the message. Depending on the structure of the system, the client function can thus derive this information from the SMS message and, for instance, present the information as follows:

20

From: STEVE@COMPANY.COM
Subject: PROJECT B

If in this case the client function in the receiving
25 mobile station is not equipped to recognise a message which follows the predetermined syntax, the client function will simply interpret the message as an ordinary text message and thus present the message as follows:

30

##STEVE@COMPANY.COM
PROJECT B

In Fig. 3c, the user text portion of the SMS message begins with the characters "#*", which in this case is
35 assumed to be an instruction which indicates to the receiving mobile station that the subsequent text field is structured in accordance with a predetermined syntax,

which in this case also includes an identifier, also referred to as "agent", of the kind discussed, inter alia, with reference to Fig. 1. In the illustrated case, it is thus assumed that this predetermined syntax indicates that the characters which are located between the initial characters "#*" and the next character for end of line "/" relate to a sender, that the subsequent characters up to the next character for end of line "/" relate to the subject of the message, and that the four characters which are placed at the end of the message constitute the identifier or the agent. Thus, the client function can derive this information from the SMS message and, for instance, present the information as follows:

15 From: STEVE@COMPANY.COM
 Subject: PROJECT B
 JobId: 1342

20 The actual identification 1342 can subsequently be used for down-loading or forwarding, preferably automatically, of the e-mail message which the identifier relates to.

25 If in this case the client function in the receiving mobile station is not equipped to recognise a message according to the predetermined syntax, the client function will simply interpret the message as an ordinary text message and thus present the message as follows:

30 #*STEVE@COMPANY.COM
 PROJECT B
 1342

35 Examples of structures of an SMS message according to a preferred embodiment of the present invention will now be described with reference to Figs 4a-4c. In these figures, it is thus assumed that the client function in the receiving mobile station is equipped to receive SMS

messages which are structured in accordance with a rule according to the invention, as will be discussed below.

In Fig. 4a the SMS message is structured as a conventional text message to be read by the receiver. Since
5 the message does not contain any specific characters which indicate to the client function in the mobile station that the message is formatted according to the defined rule, the message will be interpreted as a conventional text message and thus be presented on the display of the mobile station as follows:
10

HELLO JOHN
CALL 8246
STEVE

15

In Fig. 4b, the user text portion of the SMS message begins with the characters "(((", which in this embodiment is assumed to be an instruction which indicates to the receiver that the message is structured according to the determined rule. (In this connection, it should be
20 mentioned that this type of instruction could also be embedded in the heading of the SMS message or the like.) In this case, the rule implies that the three initial characters will be followed by a digit character which indicates how many pointer fields, each comprising three
25 characters and each being related to a corresponding information field, follow after the digit character. Consequently, in Fig. 4b the fourth character indicates that two pointer fields 31, 32 follow the digit character. Each of these pointer fields comprises a first character
30 which indicates what type of information is included in the information field to which the pointer field relates, a second character which indicates the character position in the message in which the associated information field begins, and a third character which indicates the size
35 (number of characters) of the associated information field.

Thus, in Fig. 4b the client function establishes that the message contains two pointer fields 31, 32, the information field 41 which the first pointer field 31 indicates relating to a subject field (S = "subject") which starts in the character position 20 and which has a length of 9 characters, and the information field 42 which the second pointer field 32 indicates relating to a sender field (F = "from") which starts in the character position 35 and which has a length of 17 characters. On the basis of the information provided by these pointers, the client function can collect said information fields and present them, for instance, in a manner similar to that used for the message in Fig. 3b:

From: STEVE@COMPANY.COM
Subject: PROJECT B

In Fig. 4c, the user text portion of the SMS message also begins with the characters "((((", which thus in this case also indicates to the receiver that the message is structured in accordance with the determined rule. The digit character which according to the determined rule follows the three initial parentheses indicates in Fig. 4c that three pointer fields 33, 34, 35, each consisting of three characters, follow the digit character in this message. Thus the receiver can establish that the information field 43 which the first pointer field 33 indicates relates to an identifier field (A = "agent") which starts in the character position 48 and has a length of 4 characters, that the information field 44 which the second pointer field 34 indicates relates to a subject field (S = "subject") which starts in the character position 39 and has a length of 9 characters, and that the information field 45 which the third pointer field 35 indicates relates to a sender field (F = "from") which starts in the character position 23 and has a length of 17 characters. On the basis of the information provided

by these pointers, the client function can, in a manner similar to that in Fig. 4b, collect said information fields and present them, alternatively use the identifier to forward or down-load, for instance, an e-mail or fax message related to the SMS message.

If in this case the client function in the receiving mobile station is not equipped to recognise a message in accordance with the predetermined rule, the client function will simply interpret the message as a common text message and thus present the message as an ordinary text in a manner similar to that described with reference to Figs 3a-3c.

Even if the invention has been described above with reference to an exemplifying embodiment, modifications and changes can be made within the scope of the invention, which is defined in the appended claims. As an example, a pointer field can be structured to indicate a plurality of different information fields, or a plurality of pointer fields can indicate one and the same information field, even if each pointer field in the exemplifying embodiment above indicates a respective individual information field.

CLAIMS

1. A method for transmitting to a receiver information in a message using an existing message based service in a digital mobile network, said method comprising the steps of:

providing said message with an information field which is intended to be extracted from said message by said receiver; and

providing said message with a pointer field in a position which is given by a predetermined rule while using a predetermined syntax and comprising information which indicates where in said message said information field is arranged.

2. A method according to claim 1, comprising the step of providing said pointer field with information which indicates to what type of information said information field relates.

3. A method according to claim 1 or 2, wherein said information field comprises text or data which is to be presented visually or stored in the receiver.

4. A method according to claim 1, 2 or 3, wherein said information field comprises an identifier intended to be used by said receiver when down-loading or forwarding a file stored at a place which is remote from said receiver.

5. A method according to any one of the preceding claims, comprising the step of providing said pointer field with at least one of the following types of information:

information which indicates in said message the position which corresponds to the beginning of said information field; and

5 information which indicates the length of, or the position in said message which corresponds to the end of, said information field.

6. A method according to any one of the preceding claims, wherein said receiver is a mobile station, such as a mobile telephone, a so-called smart phone or a portable computer having mobile communication capability.

7. A method according to any one of the preceding claims, wherein said digital mobile network is the so-called GSM network and said message based service is either SMS or USSD.

8. A method according to any one of the preceding claims, wherein said message is structured to comprise more than one information field and corresponding pointer fields.

9. A method for receiving in a receiver information in a message which has been transferred to the receiver with the aid of an existing message based service in a digital mobile network, said method comprising the steps of:

reading, in said message from a position which is given by a predetermined rule while using a predetermined syntax, a pointer field which is arranged in the message and comprises information which indicates where in said message a relevant information field is arranged; and extracting said information field in said message from the position which is indicated by said pointer field.

10. A method according to claim 9, comprising the step of extracting from said pointer field information which indicates to what type of information said information field relates and treating said information field in accordance therewith.

11. A method according to claim 9 or 10, wherein said information field comprises text or data which is to be presented visually or stored in the receiver.

12. A method according to claim 9, 10 or 11, wherein said information field comprises an identifier intended to be used by said receiver when down-loading or forwarding a file stored at a place which is remote from said receiver.

13. A method according to any one of claims 9-12, comprising the step of extracting from said pointer field information which indicates at least one of the following types of information:

information which indicates in said message the position which corresponds to the beginning of said information field; and

information which indicates the length of, or the position in said message which corresponds to the end of, said information field.

14. A method according to any one of claims 9-13, wherein said receiver is a mobile station, such as a mobile telephone, a so-called smart phone or a portable computer having mobile communication capability.

15. A method according to any one of claims 9-14, wherein said digital mobile network is the so-called GSM network and said message based service is either SMS or USSD.

16. A method according to any one of claims 9-15, wherein said message is structured to comprise more than one information field and corresponding pointer fields.

5 17. An arrangement for transmitting to a receiver information in a message using an existing message based service in a digital mobile network, comprising means for providing said message with an information field intended to be extracted from said message by said receiver, and
10 for providing said message with a pointer field in a position which is given by a predetermined rule while using a predetermined syntax and comprising information which indicates where in said message said information field is arranged.

15

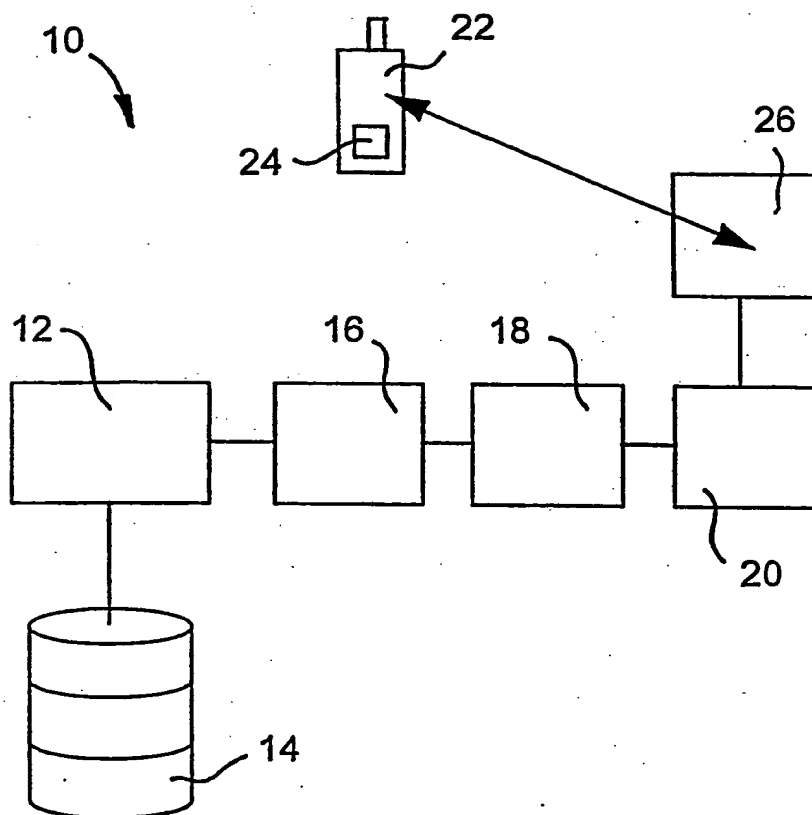
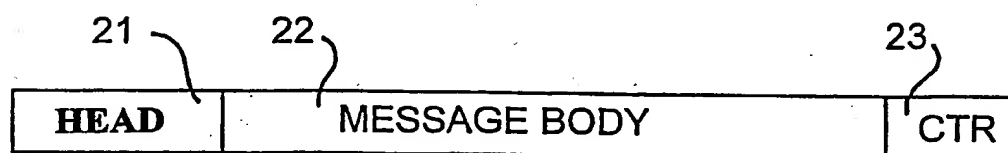
18. An arrangement according to claim 17, comprising means for providing the features stated in any one of claims 2-8.

20 19. An arrangement for receiving information in a message which has been transferred with the aid of an existing message based service in a digital mobile network, comprising means for reading, in said message from a position which is given by a predetermined rule while
25 using a predetermined syntax, a pointer field which is arranged in the message and comprises information which indicates where in said message a relevant information field is arranged, and for extracting said information field in said message from the position which is in-
30 dicated by said pointer field.

20. An arrangement according to claim 19, comprising means for providing the features stated in any one of claims 9-16.

35

1/3

**FIG. 1****FIG. 2**

20

[illegible]

FIG. 3a

[illegible]

FIG. 3b

[illegible]

FIG. 3C

[illegible]

FIG. 4a

Diagram illustrating a string of 50 characters, indexed from 0 to 50. The string is: (((2 S20 9 F3517 PROJECT_B STEVE@COMPANY.COM. Brackets 31, 32, 41, and 42 indicate specific segments of the string.

Index	Character
0	(
1	(
2	(
3	
4	2
5	S
6	2
7	0
8	
9	9
10	F
11	3
12	5
13	1
14	7
15	
16	P
17	R
18	O
19	J
20	E
21	C
22	T
23	_
24	B
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	S
41	T
42	E
43	@
44	C
45	O
46	M
47	P
48	A
49	N
50	.

[illegible]

31

32

41

21

FIG. 4b

Diagram illustrating a sequence of characters (0 to 50) and their corresponding labels (33 to 45) grouped by brackets:

Index	Character	Label
0	(33
1	(
2	(
3	3	34
4	A	
5	4	35
6	S	
7	3	36
8	9	
9	9	37
10	F	
11	2	38
12	3	
13	1	39
14	7	
15)	40
16)	
17)	
18		41
19		
20		42
21		
22		43
23		
24		44
25		
26		45
27		
28		46
29		
30		47
31		
32		48
33		
34		49
35		
36		50
37		
38		51
39		
40		52
41		
42		53
43		
44		54
45		
46		55
47		
48		56
49		
50		57
51		
52		58
53		
54		59
55		
56		60
57		
58		61
59		
60		62
61		
62		63
63		
64		64
65		
66		65
67		
68		66
69		
70		67
71		
72		68
73		
74		69
75		
76		70
77		
78		71
79		
80		72
81		
82		73
83		
84		74
85		
86		75
87		
88		76
89		
90		77
91		
92		78
93		
94		79
95		
96		80
97		
98		81
99		
100		82
101		
102		83
103		
104		84
105		
106		85
107		
108		86
109		
110		87
111		
112		88
113		
114		89
115		
116		90
117		
118		91
119		
120		92
121		
122		93
123		
124		94
125		
126		95
127		
128		96
129		
130		97
131		
132		98
133		
134		99
135		
136		100
137		
138		101
139		
140		102
141		
142		103
143		
144		104
145		
146		105
147		
148		106
149		
150		107
151		
152		108
153		
154		109
155		
156		110
157		
158		111
159		
160		112
161		
162		113
163		
164		114
165		
166		115
167		
168		116

[illegible]

33

34

35

45

44

13

FIG. 4C

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☒ **GRAY SCALE DOCUMENTS**
- ☒ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER: _____**

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.

This Page Blank (uspto)